

***What is Claimed is:***

1. An apparatus for culturing cells comprising:
  - (a) a fermentor containing bacterial growing under steady state conditions, wherein said fermentor comprises:
    - i) at least one inlet port for receiving fluid containing materials needed to maintain steady state bacterial growth;
    - ii) at least one outlet port through which medium containing bacteria can pass; and
    - iii) means for mixing fluid within said fermentor;
  - (b) a culture vessel containing eukaryotic cells attached to a solid support, wherein said culture vessel comprises:
    - i) at least one inlet port which is connected to said outlet port of said fermentor;
    - ii) means for moving fluid from said outlet port of said fermentor to said inlet port of said culture vessel; and
    - iii) at least one outlet port for removing fluid from said culture vessel.
2. The apparatus of claim 1, further comprising means for removing fluid from said outlet port of said culture vessel.
3. The apparatus of claim 2, wherein said fermentor further comprises:
  - (a) a second outlet port for removing fluid from said fermentor, wherein said second outlet port is not connected to said second vessel; and
  - (b) means for moving fluid out of said fermentor and through said second outlet port.
4. The apparatus of claim 3, further comprising:
  - (a) a reservoir of nutrient medium for growing bacteria, wherein said reservoir is connected to said inlet port of said fermentor; and
  - (b) means for moving said nutrient medium from said reservoir to said inlet port.

5. The apparatus of claim 4, wherein said fermentor further comprises a second inlet port.
6. The apparatus of claim 5, further comprising:
  - (a) a second reservoir containing material for maintaining the steady state growth of bacteria, wherein said second reservoir is connected to said second inlet port of said fermentor; and
  - (b) means for moving fluid from said second reservoir to said second inlet port.
7. The apparatus of any one of claims 1-6, wherein said culture vessel is a tissue culture flask, tissue culture dish or multiwell plate.
8. A method for assaying bacteria for their ability to attach to and invade eukaryotic cells, comprising:
  - (a) growing said bacteria in a continuous culture fermentor under steady state conditions;
  - (b) perfusing the bacteria of step (a) over said eukaryotic cells, wherein said eukaryotic cells are attached to a solid support; and
  - (c) determining the number of bacteria that have invaded or attached to said eukaryotic cells.
9. The method of claim 8, wherein said assay is performed using the apparatus of claim 1.
10. A method for separating bacteria that attach to eukaryotic cells from those that do not, comprising:
  - (a) growing said bacteria in a continuous culture fermentor under steady state conditions;
  - (b) perfusing the bacteria of step (a) over said eukaryotic cells, wherein said eukaryotic cells are attached to a solid support; and
  - (c) removing the perfusate from said eukaryotic cells to separate attached bacteria from unattached bacteria.

11. The method of claim 10, further comprising washing the eukaryotic cells of step (c) and then growing the bacteria that remain attached to said eukaryotic cells after said washing in suspension.
12. The method of claim 10, further comprising collecting the perfusate of step (c) and growing the bacteria in said perfusate in suspension.
13. The method of claim 10, wherein said method is performed using the apparatus of claim 1.
14. A method for assaying a test compound for its ability to block the invasion and attachment, and to clear infection of eukaryotic cells by bacteria, comprising:
  - (a) growing said bacteria in a continuous culture fermentor under steady state conditions;
  - (b) perfusing the bacteria of step (a) over said eukaryotic cells, wherein said eukaryotic cells are attached to a solid support;
  - (c) determining the number of bacteria that have invaded said eukaryotic cells;
  - (d) repeating steps (a) - (c) in the presence of said test compound; and
  - (e) concluding that said test compound blocks the invasion of said eukaryotic cells by said bacteria if the number of bacteria invading said eukaryotic cells is significantly lower in the presence of said test compound than in its absence.
15. The method of claim 14, wherein said method is performed using the apparatus of claim 1.
16. A method of selecting a growth rate which increases the invasiveness of bacteria for eukaryotic cells, comprising:
  - (a) growing said bacteria under steady state conditions at a first rate of growth;
  - (b) perfusing the bacteria of step (a) over said eukaryotic cells, wherein said eukaryotic cells are attached to a solid support;

- (c) determining the number of bacteria that have invaded said eukaryotic cells;
  - (d) repeating steps (a) - (c) but wherein said bacteria are grown at a second growth rate different from said first growth rate; and
  - (e) selecting the growth rate which gives the greatest number of invaded eukaryotic cells.
17. The method of claim 16, wherein said method is performed using the apparatus of claim 1.